Walter W. Meinert, P. E.
CONSULTING ENGINEER
P. O. BOX 6291
GRAND RAPIDS, MICHIGAN 49506

TELEPHONE (616) 949-3121

GROUND WATER INVESTIGATIONS & REPORTS
WELL FIELD ANALYSIS & DESIGN
EARTH RESISTIVITY SURVEYS

October 23, 1978

Mr. Thomas J. Wittmann
President
SYSTEMS TECHNOLOGY CORPORATION
245 North Valley Road
Xenia, OH 45385

Re: Ground Water Quality
Systech Waste Treatment Center
Franklin, Ohio

Dear Mr. Wittman:

We have completed a review of the ground water contamination condition at the Systech Waste Treatment Center, Franklin, Ohio. This review consisted of an evaluation of several existing monitoring wells in the vicinity of the Systech Waste Treatment Center. These monitoring wells have been installed by the Miami Conservancy District and are used to monitor ground water quality in the vicinity of the subject plant and also in the vicinity of the City of Franklin Waste Treatment Plant.

It is my understanding that through routine monitoring of ground water quality an area of ground water contamination was detected on the north side of the Systech plant, in monitoring Well No. 139. It appears that this condition was first noted in November, 1977.

The data reviewed included a very complete file of ground water quality and subsurface geology in the area of question. This information has been regularly compiled by the Miami Conservancy District. These area monitoring wells indicate the direction of ground water flow to be from southeast to northwest.

During our site inspection of the Waste Treatment Center on October 10, 1978 you mentioned the source of a previous waste spill in the dosing chamber which had originally served the four clarifiers. The location of Monitoring Well No. 139 appears to be directly downgradient from this point of contamination. Subsequent water analyses have indicated a degree of contamination in Monitoring Well No. 132. This well appears to be upgradient from the previously mentioned dosing chamber. A plot of ground water levels through the site indicates a very flat ground water surface. Under these conditions it would be possible to reverse the direction of ground water flow for brief periods. This could occur as a result of hydraulic mounding at the source of contamination or by local changes in the hydraulic gradient. During our meeting of October 10, at the M.C.D. offices with Mr. Donald Williams, Mr. Paul Plummer, and Mr. Joe Shure, it was mentioned by Mr. Plummer that the local ground water levels reflect the stage of Clear Creek. Therefore during high stream stage the direction of ground water flow may be reversed and a local area of contamination may exist in the vicinity of Monitoring Well No. 132. The area well logs indicate the presence of very permeable materials which permit rather rapid lateral movement of any contaminate once it reaches the water table.

Current Purging Methods

To remove the contaminated ground water from the vicinity of monitoring Well No. 139 it is my understanding that a 3 H.P. centrifugal pump has been operating intermittently for the past several months. It is interesting to note the trend in ground water quality during this time. Several of the included parameters have been plotted and are included herewith. The marked reduction in these parameters suggest the effectiveness of the purging operation of Well No. 139. This marked decrease in the concentration of the contaminants together with a pumping rate of only 30 g.p.m. could suggest a

rather limited extent of ground water contamination. This is also reinforced by the absence of any contaminating parameter within Monitoring Well No. 133.

Future Purging Methods

As previously discussed verbally there appear to be a couple of methods of accerlating the rate of extraction of any tainted water.

One method would incorporate the use of several small diameter (2 inch) dewatering type wells discharging through a common header. These wells could be located along the west and north sides of the plant site. Those well points along the north side would be situated south of Clear Creek. The advantages of this type of system would be to increase the effective radius of the cone of influence during pumping. There are certain disadvantages however in this procedure. One is the difficulty in noting a change in water quality from each individual well. A second disadvantage could occur if the resulting drawdown within wells along Clear Creek would induce recharge from the creek. If so, the effectiveness of the method would be lessened.

A second method would require the drilling of a larger diameter well in a centrally located area. This well should be a minimum of eight (8) inch diameter and be situated north of and near to the previously mentioned dosing chamber. Considering the relatively thin section of permeable materials in the area this well diameter should provide for adequate well screen dimensions. This well would permit higher pumping rates and would result in a steeper water surface gradient towards this so called "sump". A pumping rate of 100 g.p.m. should be considered, well hydraulics permitting. It may be necessary to set a pump in the very bottom of the well screen which is contrary to normal well construction. The purged water could be discharged to the Franklin Municipal Waste Water Plant either through the existing

pipe line or by discharging into one of the existing clarifiers. This method of purging should also be more effective in inducing ground water flow from the area near Monitoring Well No. 132. To accelerate the removal of any contaminants it is recommended that the use of this single, larger diameter well be employed.

However, to insure maximum recovery of the contaminated ground water Monitoring Well No. 139 should also continue to be pumped. Ground water quality should continue to be monitored from the three existing holes plus the additional purging well to observe the change in the concentration of the contaminants. It should not be necessary to use Well No. 132 as a purge well if the operation of the planned larger diameter well is adequate.

If you have any further questions concerning the present situation or recommended procedures please call.

Very truly yours,

Walter W. Meinert

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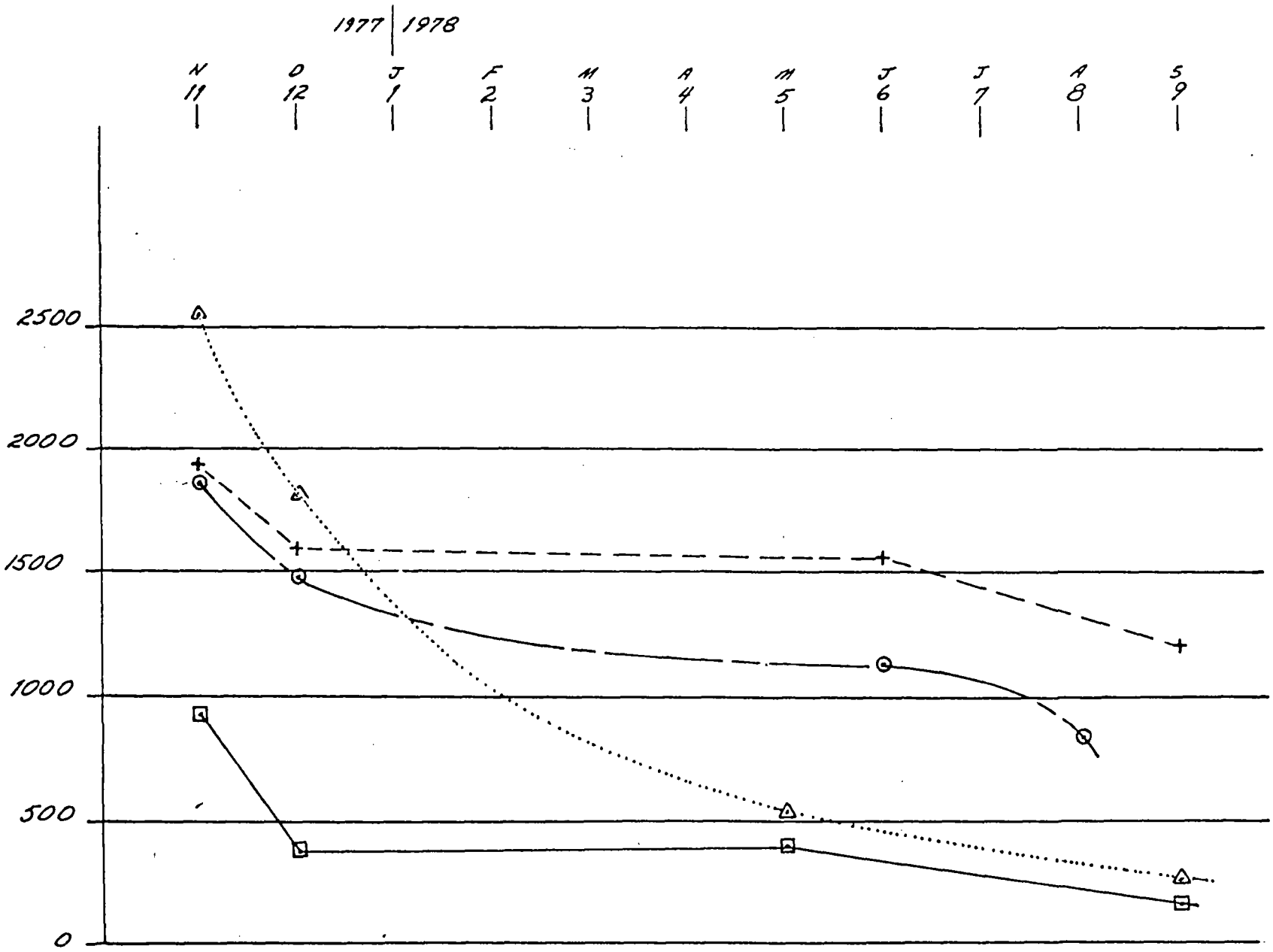
Consulting Engineer

enclosure



⊙-D.S. mg/l.
⊡-T.O.C. mg/l.
△-C.O.D. mg./l.
×-CONDUCTIVITY

WELL #139 - WATER QUALITY

SYSTECH WASTE TREATMENT CENTER
FRANKLIN, OHIO

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GRAND RAPIDS, MICHIGAN